



Alaska radon maps suggest potential scope of health concern

Jennifer Athey¹, Art Nash², Sam Knapp¹

¹Alaska Division of Geological & Geophysical Surveys (DGGs)

²University of Alaska Fairbanks, Cooperative Extension Service

DGGs' Fairbanks Office

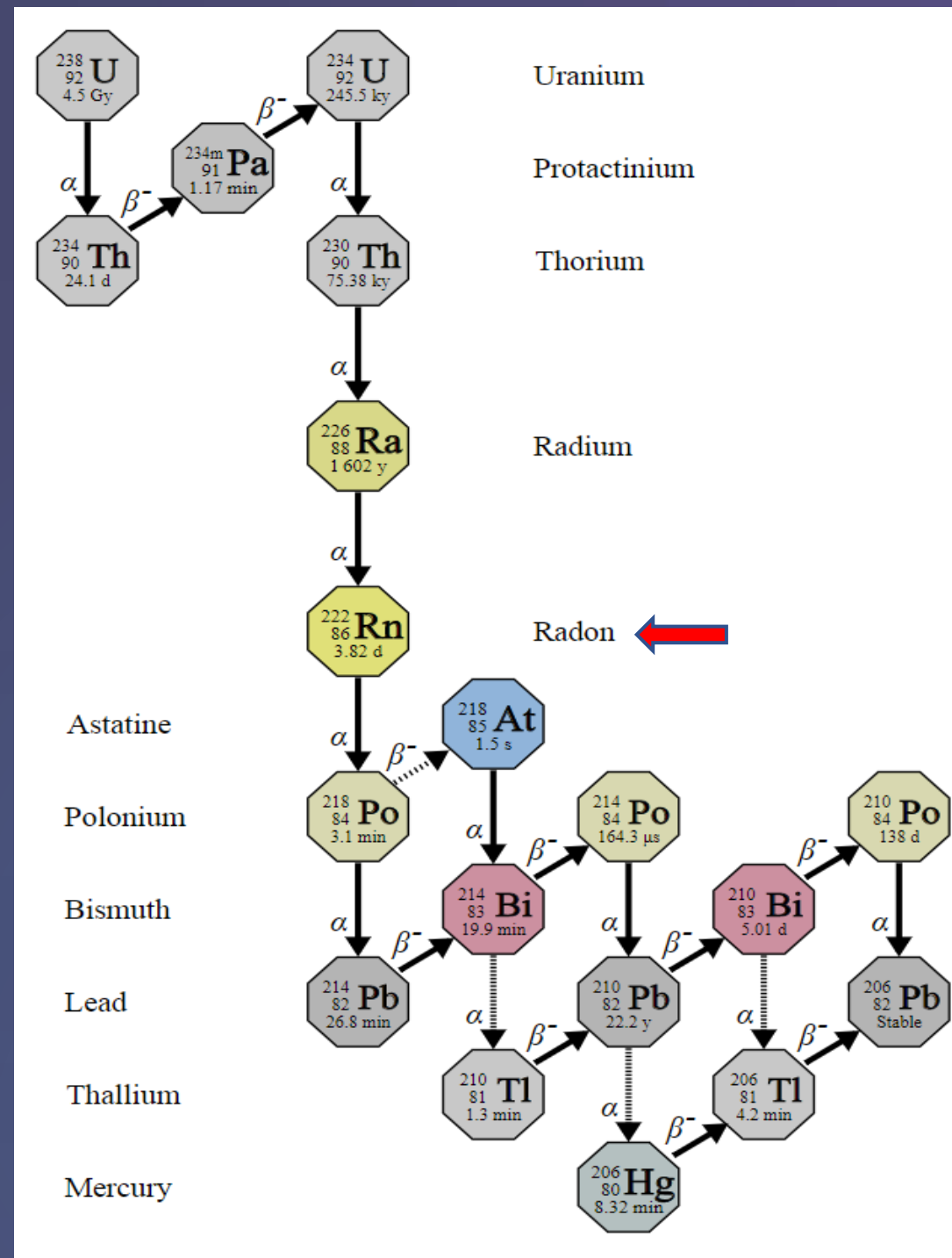


Geologic Materials Center - Anchorage



DGGs is a science-focused agency within the Alaska Department of Natural Resources. Its mission is to "determine the potential of Alaskan land for production of metals, minerals, fuels, and geothermal resources, the locations and supplies of groundwater and construction material, and the potential geologic hazards to buildings, roads, bridges, and other installations and structures" (AS 41.08.020). DGGs' goal is to provide unbiased scientific data and interpretations to answer important questions about the geology of the state, to benefit the health and welfare of all Alaskans.

U-238 decay series

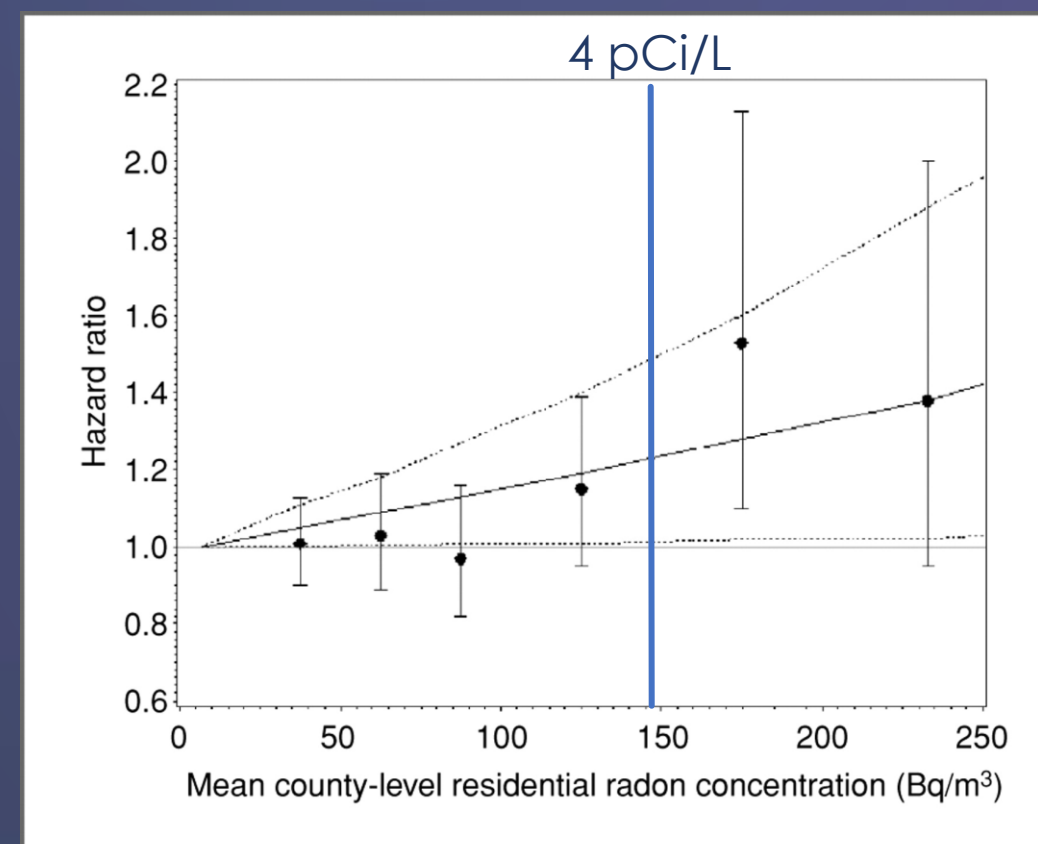


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One picocurie (abbreviated as pCi) represents 2.2 radioactive disintegrations of radium (radon's radioactive parent) per minute. At 4 pCi/L, there will be ~12,672 radioactive disintegrations (radon particles) in one liter of air over 24 hours.

When you breathe in radon gas, the radioactive particles can get trapped in your lungs and further decay to polonium and other radioactive solids that can cause damage to lung tissue.

Radon is a health concern



Radon and Lung Cancer in the American Cancer Society Cohort <https://cebp.aacrjournals.org/content/20/3/438>, Turner and others, 2011

Study participants with mean radon concentrations above 4 pCi/L experienced a 34% increase in risk for lung cancer mortality relative to those below the guideline value.

Overall, each 100 Bq/m³ (2.7 pCi/L) increase in radon was associated with an 8% increase in lung cancer risk.

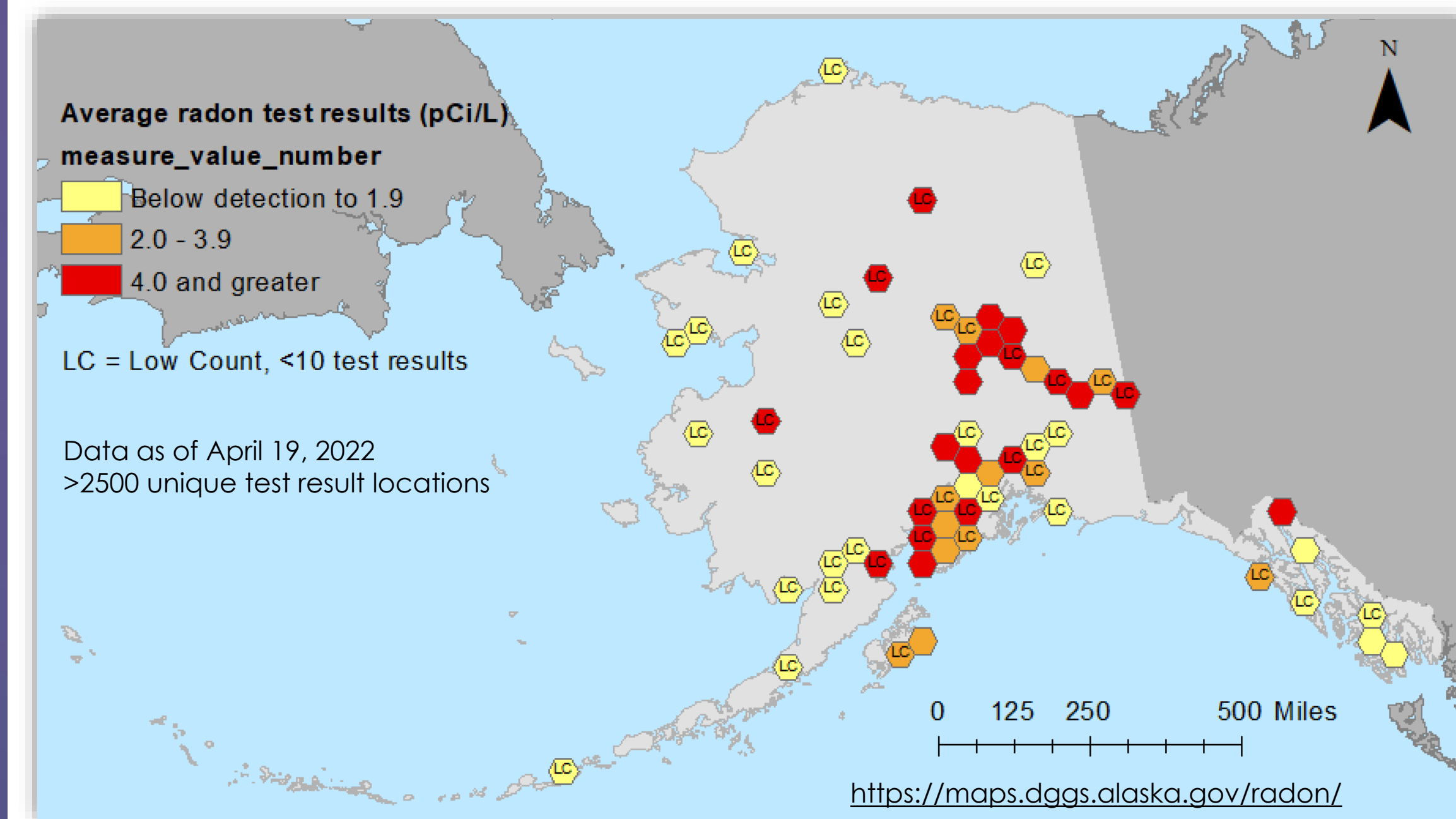
1 picocurie per liter (pCi/L) is equal to 37 Becquerels per cubic meter (Bq/m³)

Abstract

Radon is a naturally occurring radioactive gas and progeny in the uranium-238 decay chain. When radon is liberated from rocks and soils, the gas can migrate to the surface, enter buildings through their foundation, and concentrate inside. The odorless, colorless gas is the second leading cause of lung cancer after smoking and causes more than 21,000 deaths per year in the U.S. Fortunately, tests that measure radon concentrations in buildings are inexpensive and easy to conduct, and most homes can be fixed inexpensively. The Alaska Radon Program (<https://dggg.alaska.gov/hazards/radon.html>) is meeting the challenge to increase Alaskans' awareness of the hazard of radon by prompting owners to test to determine the concentration of radon in their homes and reduce exposure to radon through mitigation when necessary, ultimately decreasing lung cancer deaths.

Alaska radon testing has long indicated that the Fairbanks area, particularly the hills around the City of Fairbanks, has elevated radon levels that can cause indoor air concentrations greater than the Environmental Protection Agency's (EPA) radon action level of four picocuries per liter (pCi/L). EPA recommends homes be mitigated to lower radon concentrations if the indoor radon level is 4 pCi/L or more. Because there is no known safe level of exposure to radon, EPA also recommends that building owners consider mitigating for radon levels between 2 pCi/L and 4 pCi/L. Radon maps at <https://maps.dggg.alaska.gov/radon/> suggest that education and outreach should also be conducted in the Matanuska-Susitna Valley, Kenai Peninsula, and other areas of the state where test results are elevated and/or the potential for radon is elevated.

The radon maps are an effective tool to encourage radon testing. Alaska radon data are crowdsourced from homeowners and radon laboratories, who release their information to DGGs to help inform others about the hazard. Personally identifying information and exact locations of radon tests are held confidential by DGGs. Because testing data are still sparse or nonexistent in many locations and building construction and use plays as much a role in indoor air radon concentrations as radon availability, the maps should not be consulted in a decision about whether to test for radon. All Alaskans should consider testing the buildings in which they spend significant amounts of time.



Additional resources

- Radon circular with general radon information: <https://doi.org/10.14509/30163>
- Radon testing after earthquakes: <https://doi.org/10.14509/30168>
- Understanding your radon test: <https://doi.org/10.14509/30467>
- Mitigating radon levels at home: <https://doi.org/10.14509/30474>
- Radon in Alaska: What you should know (video): <https://doi.org/10.14509/30745>

Stack effect

Stack effect is the movement of air into and out of buildings, chimneys, flue-gas stacks, or other containers, resulting from air buoyancy.

Buoyancy occurs due to a difference in indoor-to-outdoor air density resulting from temperature and moisture differences.

The stack effect can draw ground gases, including radon, into a home if the foundation has cracks or holes.



<https://www.nps.gov/tips/how-to-preserve/briefs/3-improve-energy-efficiency.htm>

Testing and mitigating for radon

Radon test kits are available in hardware stores and other retail outlets, and for purchase online. Radon service providers will also conduct testing for you. DGGs provides free radon test kits for National Radon Action Month in January. The National Radon Program Services at <https://sosradon.org/> sells low-cost test kits.



If the radon level in your home is measured at 4 pCi/L or greater, the EPA recommends [mitigating your home](#) to lower its radon concentration. Most buildings can be successfully mitigated.

Outreach

Program staff conduct outreach and education at conferences, meetings, and other public events throughout the year. We also interface with education, housing, real estate, and health professionals.

In 2021, the program conducted the first annual Alaska Radon Poster Contest for students aged nine to 14 years.

1st Place, Leo from Randy Smith Middle School in Fairbanks

